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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/634,706	08/07/2000	Marcel DeGrandpre	99293-US	3849
23553	7590	12/17/2003	EXAMINER	
MARKS & CLERK P.O. BOX 957 STATION B OTTAWA, ON K1P 5S7 CANADA			VOLPER, THOMAS E	
			ART UNIT	PAPER NUMBER
			2665	7

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/634,706

Applicant(s)

DEGRANDPRE ET AL.

Examiner

Thomas Volper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-13 is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## DETAILED ACTION

### *Claim Objections*

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 1-16, with duplicate claim numbers 13 and 15, have been renumbered in consecutive order 1-18.

2. Claims 1-4, 6, 8, 9, 11, 17 and 18 are objected to because of the following informalities:

Claim 1:

- it is unclear whether "said links" in lines 6-7 refers to "outgoing physical links" in line 2, or "output links" in line 5.

Claim 2:

- it is unclear whether "said expansion port" in line 1 refers to "an expansion port" of the "inverse multiplexer device", or "a corresponding expansion port" on the "another like inverse multiplexer" as recited in claim 1.

- "said output port" in line 2 should be changed to --said output ports--.

Claim 3:

- "said connects" in line 3 should be changed to --said connections--.

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- it is unclear whether "said expansion port" in line 3 refers to "an expansion port" of the "inverse multiplexer device", or "a corresponding expansion port" on the "another like inverse multiplexer" as recited in claim 1.

Claim 4:

- it is unclear whether "said expansion port" in line 1 refers to "an expansion port" of the "inverse multiplexer device", or "a corresponding expansion port" on the "another like inverse multiplexer" as recited in claim 1.

Claim 6:

- "the buffers" in line 2 should be changed to "the transmit buffers".

Claim 8:

- "a plurality of physical links" in line 2 should be changed to --a plurality of incoming physical links-- in order to distinguish it from the "outgoing physical links" in line 2 of claim 1.

- "said physical links" in lines 3 and 4 should be changed to --said incoming physical links--.

- it is unclear whether "an output port" in line 3 is part of the "plurality of output ports" recited in line 2 of claim 1, or a new limitation.

- it is unclear whether "said expansion port" in lines 4-5 refers to "an expansion port" of the "inverse multiplexer device", or "a corresponding expansion port" on the "another like inverse multiplexer" as recited in claim 1.

Claim 9:

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- it is unclear whether "said expansion port" in line 1 refers to "an expansion port" of the "inverse multiplexer device", or "a corresponding expansion port" on the "another like inverse multiplexer" as recited in claim 1.

Claim 11:

- it is unclear whether "said expansion port" in line 14 refers to "an expansion port," recited in line 5, or "a corresponding expansion port," recited in line 6.

Claim 17:

- it is unclear whether "said expansion port" in line 1 refers to "an expansion port," or "a corresponding expansion port," as recited in claim 11.

Claim 18:

- it is unclear whether "said expansion port" in line 1 refers to "an expansion port," or "a corresponding expansion port," as recited in claim 11.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3-10 and 14-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 3 recites the limitation "said other devices" in line 4. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 5 recites the limitation "said devices" in line 2. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 6 recites the limitations "the address" and "the bus" in line 2. There is insufficient antecedent basis for these limitations in the claim.
8. Claim 8 recites the limitation "the like device" in line 6. There is insufficient antecedent basis for this limitation in the claim.
9. Claim 9 recites the limitation "the destination address" in line 3. There is insufficient antecedent basis for this limitation in the claim.
10. Claim 14 recites the limitation "the connected devices" in line 2. There is insufficient antecedent basis for this limitation in the claim.
11. Claim 15 recites the limitation "said control message" in line 1. There is insufficient antecedent basis for this limitation in the claim.
12. Claim 16 recites the limitations "said control byte" and "the destination address" in lines 1-2. There is insufficient antecedent basis for these limitations in the claim.
13. Claim 17 recites the limitations "the device" and "the appropriate output port of delineation block" in lines 3-4. There is insufficient antecedent basis for these limitations in the claim.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heikkinen et al. (US 6,621,794) in view of Kumata (US 6,385,165).

Regarding claim 1, Heikkinen discloses an inverse multiplexer device comprising an input port, a plurality of output ports for connection to outgoing physical links, and transmit buffers (see Figure 4). Heikkinen fails to expressly disclose an expansion port capable of receiving packets from the transmit buffers and transferring them to a corresponding expansion port on another inverse multiplexer device wherein a controller operates to output packets on any of the links, and wherein the inverse multiplexers may be cascaded. Kumata discloses a cascaded arrangement of multiplexing/demultiplexing devices (28 and 38 in Figure 4). These devices represent the inverse multiplexers of the current invention. The combining switch (71) represents the expansion ports of the present invention for transferring packets from one inverse multiplexer to the other. Kumata also discloses a controller (80) that connects to all of the selectors of the multiplexing/demultiplexing devices. It is evident from Figure 4 of Kumata that packets received on one mux/demux, (38) for instance, may be transferred to either interface, (20) or (50), via combining switch (71). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to cascade two inverse multiplexers provided by the design of Heikkinen in the arrangement disclosed by Kumata. One of ordinary skill in the art would have been motivated to do this to provide a greater number of output links to each inverse multiplexer in case one or more output links on a particular inverse multiplexer were unavailable.

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Regarding claim 2, it would have been obvious to combine two inverse multiplexers as described above by connecting the combining switch between each of the inverse multiplexers' respective transmit buffers and output ports. One of ordinary skill in the art would have been motivated to do this to route packets around an unavailable link on one inverse multiplexer to an available link on another inverse multiplexer.

Regarding claim 3, as described above, Kumata discloses a combining switch that would have been obvious to combine with two inverse multiplexers of Heikkinen. The combination described thus far does not provide for multiple switches. However, Kumata discloses that other additional combination switches may be added for connecting to other mux/demux devices (see To/From Other Combining Switches (70), Figure 4). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to include more switches so that each of the streams of the demultiplexed packet stream in one of the inverse multiplexers of Heikkinen could be independently switched to another inverse multiplexer. One of ordinary skill in the art would have been motivated to do this to provide an even greater number of output links to each inverse multiplexer.

Regarding claim 4, the combination of Heikkinen et al. in view of Kumata provided thus far fails to expressly disclose that the expansion ports, or combining switches of Kumata, are connected in a parallel ring. However, a parallel ring is a well known formation in the art for connecting multiple devices. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to connect the combining switches in a parallel ring formation. One of ordinary skill in the art would have been motivated to do this so that packets



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could be transferred between a multitude of inverse multiplexing devices while providing protection capabilities, a common feature for parallel rings, for that information.

Regarding claim 5, Heikkinen discloses that an inverse multiplexer uses IMA Control Protocol (ICP) cells that provide the definition of an IMA frame. In addition, the transmitter must align transmission of IMA frames on all links (col. 4, line 63 – col. 5, line 7). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to carry such control messages on the parallel ring the combination of Heikkinen et al. in view of Kumata provided thus far. One of ordinary skill in the art would have been motivated to do this so that the IMA frames being transmitted on multiple inverse multiplexing devices would be synchronized.

Regarding claim 8, Heikkinen discloses an inverse multiplexer that operates in the receive direction (see Figure 5). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate this receive capability into the combination of Heikkinen et al. in view of Kumata described thus far. One of ordinary skill in the art would have been motivated to do this to allow bi-directional communication through the cascaded inverse multiplexers.

***Allowable Subject Matter***

16. Claims 6, 7, 9 and 10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 6, the closest prior art of record, Heikkinen et al. in view of Kumata, fails to show address registers for storing an address on a ring of the transmit buffers.

Regarding claim 9, the closest prior art of record, Heikkinen et al. in view of Kumata, fails to show that each expansion port comprises a message assembler for assembling outgoing bytes into messages with addresses.

17. Claims 11-13 are allowed.

The following is an examiner's statement of reasons for allowance:

Claim 11 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of cascading inverse multiplexing devices comprising "one of said inverse multiplexer devices forming a master" and "forming an inverse multiplex group comprising physical links connected to at least one other said device" and "transmitting said received packets over said physical links forming the inverse multiplex group." It is noted that the closest prior art, a combination of Heikkinen et al. in view of Kumata, provides for cascading multiple inverse multiplexers. However such a combination does not specifically disclose forming an inverse multiplex group among physical output links on more than one inverse multiplexer and transmitting packets on the links associated with that group.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

18. Claims 14-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

*Conclusion*

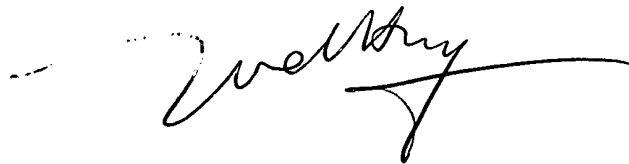
19. Any inquiry concerning this communication, or earlier communications from the examiner should be directed to Thomas Volper whose telephone number is 703-305-8405 and fax number is 703-746-9467. The examiner can normally be reached between 8:30am and 6:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached at 703-308-6602. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Thomas E. Volper



December 10, 2003



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